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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application no.	:	10/068,710
Appellant	:	Anees Narsinh et al.
Assignee:	:	ALCATEL
Title	:	Preclassifying traffic during periods of oversubscription
Filed	:	February 6, 2002
Art Unit	:	2665
Examiner	:	Molinari, Michael J.
PTO Docket no.	:	45390/JEC/X2/134069
Alcatel Docket no.	:	134069
Customer no.	:	35114
Confirmation No.	:	9204

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TRANSMITTAL OF BRIEF ON APPEAL

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please find enclosed a complete Brief in the above identified case in response to the Office Action mailed by the Patent Office on March 30, 2004, in which all claims were twice rejected.

Respectfully submitted,

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Sir:

Related Appeals and Interferences

There are no appeals or interferences known to appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 1-23 are the subject of this appeal. No other claims are pending, and no claims have been cancelled.

Status of Amendments

No amendment After Final Rejection has been filed and no amendment is filed with this Brief.

Summary of Invention

The first embodiment of a data communication node according to the present invention is best depicted in Figures 1–3. A high-level schematic of a data communication node with a plurality of switching interfaces is illustrated in Figure 1 while Figure 2 illustrates the structure of a switching interface including a novel access controller and switch controller. A second embodiment of the invention pertains to the structure of the access controller and is schematically illustrated in Figure 3. A third embodiment of the invention in Figure 4 illustrates the method of using the novel data communication node to manage data traffic through the node.

The first embodiment of the data communication node 10 (see Figure 1 and paragraph 16) according to the present invention is exemplified in claim 1. The system comprises an access controller 54 (see, Figure 3 and, e.g., paragraph 18 of the instant specification) and a switching controller 52 (see, e.g., Figure 2 and paragraph 18). The access controller and switching controller are serially connected such that an incoming packet received from a local area network (LAN) 30 is processed by the access controller first and, if applicable, by the switching controller second. The node is therefore adapted to provide traffic management at the two levels, namely the novel access controller as well as the switching controller.

The access controller receives an inbound packet, determines which of a plurality of flow categories to which the packet belongs, a process referred to as classification, and subsequently processes the packet in accordance with instructions defined for the flow category to which the packet belongs. The classification process produces a first set of classification information, otherwise referred to as "preclassification information" in the specification (see claim 3), with which the access controller determines whether to admit the packet or not. If the packet is admitted by the access controller, it is transmitted to the switching controller. Packets that are admitted into the data communication node by the access controller may be temporarily retained in a buffered 104 (see Figure 3), in some embodiments, to account for situations in which the rate at which bursts of packets are received by the access controller is higher than the rate at which the switching controller or communication node is able to process the packets.

Such a situation may occur, for example, when a port is oversubscribed (see paragraph 2, et. seq.).

Packets that are admitted into the data communication node are received by the switching controller where additional classification and or forwarding operations may be performed and a second set of classification information generated. The second set of classification information is subsequently used to forward each packet to its destination address.

In the second embodiment of the invention exemplified in claim 9, the access controller (see Figure 3 and paragraphs 21-32—particularly paragraphs 26-27—for detailed description of structure embodied in the claims) includes an input that receives an inbound packet, a classification engine coupled to the input for performing the initial classification operation on the inbound packet, a buffer for storing the admitted inbound packet received from the LAN, and a disposition engine for determining whether to admit the incoming packet based in the classification information and the available capacity of the buffer. If buffer space is available and or the packet afforded a preference based on the classification information, the disposition engine admits the packet by transmitting it to the switching controller where it is forwarded in the direction of the destination node in the network.

In the third embodiment of the invention exemplified in claim 15 (sea also Figure 4 and paragraphs 33-35), namely a method for packet traffic management, a data communications node with an access controller is adapted to perform the steps including: receiving an inbound packet, classifying the inbound packet to generate classification information, and determining the degree to which the system is able to accept additional incoming packets indicated by a metric referred to as "congestion status data" (see paragraphs 18-19). Based on the congestion status data, the method further includes the steps of admitting the inbound packet and transmitting the inbound packet to the switching controller.

In each of the three embodiments, the novel access controller of the present invention allows packets to be preclassified at an access controller level to determine whether the packet is to be admitted and forwarded to the switching controller. The step of preclassification at the access controller allows packets of higher priority to be

admitted with a preference over packets of lower priority, which (1) helps to prevent high priority packets from being dropping in favor of lower priority packets when the packet buffer is full and (2) may further help to obviate the need for the switching controller to expend processing resources to execute classification operations for packets that are ultimately filtered in the node during periods of oversubscription, for example.

Issues

Issue 1—Whether claim 1 is patentable under 35 U.S.C. § 103(a) over U.S. patent no. 6,047,326 to Kilkki (hereafter "Kilkki") in view of U.S. patent no. 6,252,849 to Rom *et al.* (hereafter "Rom")?

Issue 2—Whether claim 2 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 3—Whether claim 3 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 4—Whether claim 4 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 5—Whether claim 5 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 6—Whether claim 6 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 7—Whether claim 7 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 8—Whether claim 8 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 9—Whether claim 9 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 10—Whether claim 10 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 11—Whether claim 11 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 12—Whether claim 12 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 13—Whether claim 13 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 14—Whether claim 14 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 15—Whether claim 15 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 16—Whether claim 16 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 17—Whether claim 17 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 18—Whether claim 18 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 19—Whether claim 19 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 20—Whether claim 20 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 21—Whether claim 21 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 22—Whether claim 22 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Issue 23—Whether claim 23 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Grouping of Claims

For each ground of rejection which appellant contests herein which applies to more than one claim, such additional claims, to the extent separately identified and argued below, do not stand or fall together.

The Argument

Prior to discussing each art rejection appearing below as Issues 1–23, Appellant would first like to bring to the Board's attention the following specific statement made by the Examiner with respect to the rejection of claim 1 (office action of March 30, 2004, paragraph 3) and a similar statement with respect to the rejection of claim 9 (office action of March 30, 2004, paragraph 11):

> "Kilkki discloses a data communication node comprising: and access controller" and that "Kilkki differs from claim 1 in that he fails to disclose a switching controller. However, the use of a switching controller for managing output from a network device is old and well known in the art. For example, Rom et al. disclose a switching controller (Switch, see Figure 2, #205) coupled to the access controller ..."

As argued below, Appellant believes the Examiner's assertion that Kilkki discloses and access controller as claimed, and that the purported access controller is separate from and serially connected to the switching controller is unsupported and erroneous. In fact, there is no suggestion in the art that the cited references be combined so as to create the two stages of packet classification created by the serial connection and serial processing of a packet in an access controller and switching controller, as claimed in each of the independent claims 1, 9, and 15.

Issue 1—Whether claim 1 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Claim 1 is patently distinguishable from U.S. patent no. 6,047,326 to Kilkki (hereafter "Kilkki") and U.S. patent no. 6,252,849 to Rom *et al.* (hereafter "Rom"), either alone or in combination, because Kilkki fails to teach the access controller of claim 1, Rom fails to disclose the switching controller of claim 1, there is no motivation to combine Kilkki and Rom, and the combination of Kilkki and Rom fail to suggest claim 1 in its entirety.

(a) Kilkki fails to teach the access controller of claim 1

Independent claim 1 recites an access controller and a switching controller, *both* of which are adapted to perform complementary packet classification operations. The access controller, which is the first of the series of two classifiers encountered by an inbound packet, performs classification of the inbound packet for purposes of generating classification information used by the data communication node to determine whether to admit the packet or not. The switching controller then receives the packet if and only if the access controller provides to the packet access by admitting the packet. If and only if provided access, the switching controller can perform secondary classification operations not performed at the access controller, including packet forwarding operations and or packet modifications preceding transmission of the packet to the next node.

After the initial stage of classification of the packet, the access controller generates a first set of classification information (i.e., priority in paragraph 23) with which the access controller may determine whether to admit the packet. The packet fields used to make the initial classification may, but need not necessarily include, a protocol in the received packet, the 802.1P/Q tag status of the packet, the packet's Layer 2 encapsulation type, the packet's TOS (type of service) values (paragraph 23).

In the process of classifying the packet at the access controller, the data communications controller can make intelligent decisions as to which packets may be afforded resources in the switching controller as well as scarce buffer capacity. In

addition, the inclusion of the initial stage of classification at the access controller serves to distribute the classification operations across a plurality of processors and thereby reduce the computational burden commonly carried by the switching controller alone.

In support of the obviousness rejection of claim 1, Examiner asserts that Kilkki discloses all limitations of the present invention with the exception of a switching controller disclosed by Rom (final office action, paragraph 3). In particular, Examiner cites to Kilkki at column 7, lines 28-42, which teaches two separate network devices, namely (1) a user/network interface (UNI) 24 (see col. 7, lines 28-29, and Figure 2) and (2) a network node 32 (see col. 7, lines 29-42, Figure 2). The UNI is an element of a special node referred to as an *access node* (col. 6, lines 1-2). The network node is one example of another special node referred to as a *core node* (col. 5, line 65, to col. 6, line 5). The access node and core nodes are defined in the Simple Integrated Media Access (SIMA) service model discussed below.

A function of the access node is to generate a priority value that is applied to an Asynchonous Transfer Mode (ATM) cell and the cell transmitted to the core node (see col. 8, lines 7-22). Upon receipt, the core node inspects the priority value in the cell applied by the access node and determines whether to filter the cell based on the priority value and the state of the core node's buffer (see col. 8, lines 23-38).

In citing to Kilkki at column 7, lines 28-42, it is unclear whether Examiner relies on the disclosure of the access node or the core node because both nodes are discussed in the cited passage. Although not certain, it would appear that Examiner has relied on the teachings of the *access node* as evidence of the initial packet classification operation of claim 1, and relied on the teachings of the *core node* for evidence of the packet admission operation of claim 1. If this assumption is correct, Kilkki does not disclose or suggest claim 1 because claim 1 recites that *both* the initial packet classification operation and packet admission operation are performed in a single node, namely *the access controller*.

The division of the classification and admission operations across two network devices in Kilkki is based upon a traffic engineering configuration called the SIMA service model. Kilkki summarizes SIMA beginning at col. 5, line 65:

> A typical implementation of the SIMA service utilizes two primary components: access nodes and core network nodes, which have fundamentally different functional responsibilities. For example, access nodes, which may be a user/network interface, perform the task of measuring traffic for every connection, whereas at the core network nodes, the traffic control functions do not need to know anything about the properties of individual connections.

Kilkki further appropriates the SIMA model for the purpose of eliminating "burdensome traffic management functions" involving descriptors, quality of service parameters, service classes, connection admission control (CAC), or usage parameter control (UPC) (col. 5, lines 42-56). As stated by Kilkki beginning at column 5, line 56:

> All of these [burdensome traffic management] functions are effectively replaced by functions performed by two autonomous units: a measuring unit, provided at a user/network interface, and a cell scheduling and buffering unit, provided at a network node. The SIMA service concept, from a user's perspective, is simple and understandable, because there are no pre-defined traffic or quality parameters associated with each connection, and charging for connection usage is based solely on the value of [the nominal bit rate at the access node] and the duration of the connection.

As illustrated by the above passages, Kilkki merely states that that the access node determines the cell priority for the benefit of the core node, but fails to suggest that the priority be generated via the first classification operation of a two stage classifier. With respect to the core node (i.e., network node), Kilkki merely states that the core node receive the cell from the access node and discards the cell based in part on the priority value generated by the access node without performing classification at the core node. It is clear, therefore, that Kilkki does not teach a single *access controller* adapted to perform the first classification operation executed in advance of the second

classification operation in the switching controller. Stated differently, Kilkki fails to suggest the access and switching controllers cooperate together to form the *two-stages classifier* of claim 1.

(b) Rom fails to disclose the switching controller of claim 1

Examiner concedes that Kilkki fails to disclose a switching controller, for which he cites Rom. In particular, Examiner cites the following (final office action, paragraph 3):

> Kilkki differs from claim 15 in that he fails to disclose a switching controller. However, the use of a switching controller for managing output from a network device is old and well known in the art. For example, Rom et al. disclose delivering the inbound packet to a switching controller (citation omitted) coupled to an access controller ... which has the advantage of forwarding the packet to its destination via the correct port.

Although Appellant would concede that Rom discloses a form of "switching controller" and that the switching controller performs classification, Rom does not disclose or suggest that the switching controller designed to execute a subset of the classification operations needed to supplement the initial classification operations allocated to the access controller of claim 1.

(c) There is no motivation to combine Kilkki and Rom

Claim 1 is allowable because the motivation advanced by Examiner is insufficient to support a prima facie case of obviousness. Examiner has stated that one skilled in the art would be motivated to "incorporate the use of switch controller as taught by Rom et al. into the invention of Kilkki to achieve the advantage of *fairly allocating network resource*" (office action, page 3, lines 2-4). This statement, however, (1) fails to indicate what network resources of Kilkki and Rom are combined to fairly allocate, (2) fails to state where in the prior art the advantage of *fair network resource allocation* is achieved or suggested, and (3) fails to provide a motivation to combine Kilkki and Rom, specifically, to achieve the claimed data communication node. Appellant respectfully

asserts that the stated motivation to combine is unduly vague and therefore insufficient to support a prima facie case of obviousness.

During prosecution, Appellant had requested and failed to receive any additional foundation explaining the motivation to combine sufficient to lead a skilled artisan to make the claimed invention without impermissible hindsight (final office action response mailed 3/2/04, pages 7-8). In particular, Appellant had requested that Examiner identify the resource being allocated if Kilkki and Rom were combined, and to identify where in the prior art there is some teaching or suggestion to select Kilkki and Rom and to then combine them to produce the present invention.

In the absence of a specific reference or a line of reasoning establish the motivation to combine Kilkki and Rom, Appellant is unable to (1) assess the scope of such a motivation, (2) determine the level of skill in the art, or (3) identify the presence of evidence that teaches away from the combination of Kilkki and Rom.

(d) The combination of Kilkki and Rom fail to teach claim 1

The combination of Kilkki and Rom fail to teach that the classification operations be performed *sequentially* by two controller connected *in series*. That is, even if one were to assume *arguendo* that Kilkki discloses the claimed access controller and Rom discloses the claimed switching controller, the cited art fails to disclose or suggest that the classification operations performed by the communications node in claim 1 be distributed between the two controllers claimed. If not serially distributed as in claim 1, the cited art could be combined such that a *single* processor, i.e., a *single switching controller*, were employed to execute all classification operations. Although one has option of implementing a single-processor system, the present invention staggers the classification operations to reduce the burden on the switching controller and reducing the probability of a bottleneck that could require packet filtering.

Stated differently, there is no suggestion in the prior art or in the prosecution history that would motivate one skilled in the art that the filtering processor in Kilkki be *serially connected to* and yet *separate from* the Rom switching controller. As such, Kilkki and Rom could be combined so as to create a single processor responsible for the filtering operations (Kilkki) and forwarding operations (Rom). In the absence of such a

suggestion, however, Appellant respectfully maintains that the manner in which elements of the prior art are combined claim 1 is novel and unobvious with respect to the cited art and even overcomes the disadvantages suffered by the prior art.

Issue 2—Whether claim 2 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 2 recites that the access controller of claim 1 is a *media access controller*, which is not disclosed in the cited art. The media access controller is a controller operating at the media access control (MAC) level, which refers to Layer 2 of the Open Systems Interconnect (ISO) reference model discussed by Rom (col. 5, lines 5-29) as well as countless other publications known to those skilled in the art. As described in Rom, the MAC layer is responsible for, among other things, issuing control packets to inhibit the transmission of frames during periods of traffic congestion, for example. In the case of carrier sense multiple access (CDMA) environments, for example, the media access controller may also perform collision detection where many users share the transport medium.

Using the media access controller to execute the initial classification operation in conjunction with other OSI Layer 2 operations enables the data communication node to determine—earlier than prior art switches—whether to provide the packet admission before the packet reaches the node's switching controller, thus obviating the need to allocate resources in the switching controller should it later be determined to drop the packet.

In support of the rejection, Examiner asserts that Kilkki discloses that the media access controller based upon col. 5, lines 11-24 and 43-44 [sic], respectively:

> The present invention is directed to an improved system and method for managing the communication of information over a network and charging for use of a service connection provided over the network. An embodiment of the present invention exploits many of the advantageous aspects of ATM technology while obviating many of the disadvantages

> associated with conventional ATM traffic control approaches. A network or group of networks, such as the Internet, may be implemented using the principles of the present invention so as to significantly reduce the complexity and cost of the traffic management scheme required to effectively manage the flow of information through the network.

and

> The service concept described herein may be viewed as a Simple Integrated Media Access (SIMA) service model.

Examiner's reliance on the SIMA service model is, however, misplaced because the SIMA service model, as explained by Kilkki, refers to a traffic management scheme *in two or more nodes in a network* including an access node and a core node. In particular, Kilkki assigns packet marking operations to access nodes and assigns packet filtering operations to core nodes, thus distributing specialized tasks to nodes throughout the network. The SIMA service model, however, does not disclose or suggest where or how the SIMA operations may be performed *within a single node*. Nor does Kilkki disclose or suggest that any of the SIMA operations be performed in a media access controller in conjunction with other OSI Layer 2 operations. Thus, claim 2 is patently distinguishable from the prior art.

Issue 3—Whether claim 3 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 3 recites that the first set of classification information includes a priority associated with the inbound packet. Dependent claim 3 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 1. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 1.

Issue 4—Whether claim 4 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 4 recites that the access controller gives precedence in admitting packets associated with a first priority over packets associated with a second priority. Dependent claim 4 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 1. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 1.

Issue 5—Whether claim 5 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 5 recites that access controller includes a buffer storing admitted inbound packets. Dependent claim 4 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 1. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 1.

Issue 6—Whether claim 6 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 6 recites congestion status data that includes a buffer utilization level, such that the access controller admits the inbound packet if the utilization level is lower than a predetermined threshold level. Dependent claim 6 is considered allowable over the references applied in its rejections for the same reasons discussed under Issues 1 and 5. Inter alia, none of these references, taken either singly

or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 1 and 5.

Issue 7—Whether claim 7 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 7 recites that the access controller discards the inbound packet if the utilization level is higher than a predetermined threshold level. Dependent claim 7 is considered allowable over the references applied in its rejections for the same reasons discussed under Issues 1 and 5. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 1 and 5.

Issue 8—Whether claim 8 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 8 recites that access controller discards the inbound packet based on a discard probability that varies based on the first set of classification information. The discard probability is a value defined in context of the Random Early Detection (RED) and Weighted Random Early Detection (WRED) (paragraph 28), which are adaptive congestion avoidance schemes used to drop packets prior to periods of high congestion.

Instead of discarding the inbound packets as a function of a discard probability using RED or WRED, for example, Kilkki teaches that a memory manager 89 determines an allowable priority level based upon the occupancy state of a memory or, in the alternative, the unoccupied buffer capacity (col. 15, lines 48-65).

In support of the rejection, Examiner also cites a discussion of cell loss in Kilkki at col. 18, line 57, to col. 18, line 12. The discussion of cell loss, however, appears to be an estimated value used to characterize as a function of priority (col. 18, lines 32-40), but is not used for any discard decisions in the switch. See col. 15, line 48 to col. 16,

line 3, and col. 18, line 57, to col. 19, line 12, of Kilkki for a formula with which to compute the cell loss ratio of cells in terms of the priority.

While Kilkki computes the probability of cell loss *as a function of priority*, Kilkki does not suggest actually employing a mechanism to discard packets *as a function of the discard probability* in a data communications node. In addition, Kilkki does not appear to disclose or suggest that the memory manager 89 that determines the loss probability is incorporated into the access controller as claimed.

Clearly, claim 8 is not disclosed or suggested by Kilkki, as is therefore allowable.

Issue 9—Whether claim 9 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Claim 9 is patently distinguishable from Kilkki and Rom, either alone or in combination, because Kilkki fails to teach the access controller of claim 1, Rom fails to disclose the switching controller of claim 1, there is no motivation to combine Kilkki and Rom, and the combination of Kikko and Rom fails to teach claim 9.

(a) Kilkki fails to teach the access controller of claim 9

Independent claim 9 recites an access controller adapted to perform classification, buffering, and disposition of a packet before it is transmitted to the switching controller. The access controller performs classification of the packet for purposes of generating classification information used by the disposition engine to determine whether to admit the packet. The switching controller subsequently receives the packet if and only if the access controller provides access to the packet. The access controller in combination with the disposition engine can make intelligent decisions as to which packets to allocate resources in the switching controller.

In support of the obviousness rejection of claim 9, Examiner asserts that Kilkki discloses all limitations of the present invention with exception of a disposition engine disclosed by Rom (final office action, paragraph 11). Kilkki, however, does not suggest alone or in combination an access controller adapted to perform classification and does

not suggest the two stages of classification performed by the novel combination of access controller and switching controller of the present invention.

As described in more detail under *Issue 1*, Kilkki teaches a SIMA-based network including a core network node (e.g., a network node) that receives a cell from an access node (e.g., a user/network interface (USI)), inspects a priority value in the cell, and determines whether to filter the cell based on the priority value and the state of the network node's buffer. Appellant is unaware of any disclosure or suggestion in the prior art to perform any of the operations claimed in claim 9 in the access controller specifically. In particular, Kilkki fails to suggest performing classification, buffering, and disposition of a packet in the access controller as opposed to the switching controller.

(b) Rom fails to disclose the disposition engine of claim 9

Examiner concedes that Kilkki fails to disclose a disposition engine, for which he cites Rom. In particular, Examiner states (final office action, paragraph 11) that:

> Kilkki differs from claim 9 in that he fails to disclose the ***disposition engine*** delivering the inbound packet to the switching controller if the packet is admitted. However, the use of a switching controller for managing output from a network device is old and well known in the art. For example, Rom et al. disclose delivering the inbound packet to a ***switching controller*** (citation omitted), which has the advantage of forwarding the packet to its destination via the correct port. (emphasis added)

Examiner's argument fails for three reasons. First, claim 9 recites a disposition engine that is explicitly stated to reside within the access controller, which Rom does not.

Second, Examiner has offered two inconsistent interpretations of the "switching controller" in Rom. Examiner initially asserted that the "switching controller" in Rom is a switching controller as claimed in claim 1 (see *Issue 1*) and similar to claim 9. Examiner also asserts that the "switching controller" in Rom is a disposition engine as claimed in

claim 9. Since the switching controller of claim 9 is different than the disposition engine of claim 9, Appellant respectfully asserts that the statements by Examiner are mutually exclusive and, therefore, insufficient to support a rejection.

Third, Examiner's suggested that the disposition engine of claim 9 is anticipated by the switching controller of Rom is erroneous. The so-called switching controller in Rom is for "determining whether an information packet is valid and for determining to which of the output port(s) the received information packets are to be routed" (col. 4, lines 27-30). In contrast, the disposition engine in claim 9 is adapted to receive the classification information, determine whether to admit the inbound packet, and deliver the inbound packet *to a switching controller* if the packet is admitted. The disposition engine of claim 9, however, does not check the validity of a packet and does not determine where to forward the packet. Clearly then, Rom does not disclose or suggest the claimed disposition engine of claim 9.

Claim 9 is therefore allowable.

(c) There is no motivation to combine Kilkki and Rom

Claim 9 is also allowable because the motivation advanced by Examiner is insufficient to support a prima facie case of obviousness. Examiner has stated on page 4, lines 18-21, of the March 13, 2004 office action that:

> [o]ne skilled in the art would have recognized the advantage of the switching controller as taught by Rom et al. Therefore, it would have been obvious to a person with ordinary skill in the art at the time of the invention to incorporate the use of a switching controller as taught by Rom et al. into the invention in Kilkki to achieve the advantage of forwarding the packet to its destination address.

Examiner's argument fails for two reasons. First, Examiner's statement does not support a prima facie case of obviousness because it is a conclusory statement that fails to set forth the "advantage of forwarding the packet" that is achieved by incorporating the switching controller of Rom with Kilkki. If, on the other hand, Examiner is suggesting

that packet forwarding *is the* advantage, then the statement is overly vague and lacks the specificity to suggest combining Rom with Kilkki in the manner claimed.

Second, Examiner's fails to address the fact that claim 9 recites *both a disposition engine and a switching controller.* If the Examiner's statement quoted above refers to the switching controller recited in claim 9, then Examiner has failed to show where the prior art discloses or suggests the disposition engine separate and apart from a switching controller. If, however, the Examiner refers to the switching engine as a form of disposition engine, then the Examiner has incorrectly attributed the forwarding operations to the disposition engine, and failed to show where Rom suggests implementing a disposition engine within the access controller for purposes of determining "whether the inbound packet is to be admitted based on a utilization level of the buffer," as is claimed in claim 9.

(d) The combination of Kilkki and Rom fail to teach claim 9

The combination of Kilkki and Rom fail to teach that the access controller performs classification operations, buffering, and access control operations based upon buffer occupancy level before transmitting the admitted packet to a switching controller. In particular, the prior art fails to disclose an access controller comprising a classification engine coupled to the input for classifying the inbound packet; a buffer for storing admitted inbound packets; and a disposition engine for determine whether the inbound packet is to be admitted based on a utilization level of the buffer and from the classification information generated by the classification engine, and for delivering the inbound packet to a switching controller if the packet is admitted.

Issue 10—Whether claim 10 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 10 recites that a set of classification information generated by the classification engine in the access controller includes a priority associated with the inbound packet art. Dependent claim 10 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 9. Inter

alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 9.

Issue 11—Whether claim 11 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 11 recites that the disposition engine gives precedence in admitting packets associated with a first priority over packets associated with a second priority. Dependent claim 11 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 9. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 9.

Issue 12—Whether claim 12 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 12 recites that the disposition engine admits the inbound packet if the buffer utilization level is lower than a predetermined threshold level. Dependent claim 12 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 9. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 9.

Issue 13—Whether claim 13 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 13 recites that the disposition engine discards the inbound packet if the utilization level is higher than a predetermined threshold level.

Dependent claim 13 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 9. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 9.

Issue 14—Whether claim 14 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 14 recites that disposition engine discards the inbound packet based on a discard probability that varies based on the first set of classification information. As discussed above in regards to Issue 8, the discard probability is a value defined in context of the Random Early Detection (RED) and Weighted Random Early Detection (RED) congestion avoidance schemes.

Instead of discarding the inbound packets as a function of a discard probability using RED or WRED, for example, Kilkki teaches that a memory manager 89 determines an allowable priority level based upon the occupancy state of a memory or, in the alternative, the unoccupied buffer capacity (col. 15, lines 48-65).

In support of the rejection, Examiner also cites a discussion of cell loss in Kilkki at col. 18, line 57, to col. 19, line 12. The discussion of cell loss, however, appears to be an estimated value used to characterize as a function of priority (col. 18, lines 32-40), but is not used for any discard decisions in the switch. See col. 15, line 48 to col. 16, line 3, and col. 18, line 57, to col. 19, line 12, of Kilkki for a formula with which to compute the cell loss ratio of cells in terms of the priority.

While Kilkki computes the probability of cell loss *as a function of priority*, Kilkki does not suggest actually employing a mechanism to discard packets *as a function of the discard probability* in a data communications node. In addition, Kilkki does not appear to disclose or suggest that the memory manager 89 that determines the loss probability is incorporated into the access controller as claimed.

Clearly, claim 14 is not disclosed or suggested by Kilkki, as is therefore allowable.

Issue 15—Whether claim 15 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Claim 15 is patently distinguishable from Kilkki and Rom, either alone or in combination, because Kilkki fails to teach an access controller for executed the steps of claim 15, Rom fails to teach a switching controller for executed the steps of claim 15, there is no motivation to combine Kilkki and Rom, and the combination of Kikko and Rom fail to teach the method of claim 15.

(a) Kilkki fails to teach the access controller of claim 15

Independent claim 15 recites a method by which an access controller classifies a packet, buffers the packet, and delivers the packet to the switching controller for packet forwarding operations. The switching controller subsequently receives the packet if and only if the access controller admits the packet.

In support of the obviousness rejection of claim 15, Examiner asserts that Kilkki discloses all limitations of the present invention with exception of a disposition engine disclosed by Rom. Kilkki and Rom, however, do not teach or suggest alone or in combination *an access controller adapted to perform classification* and does not teach a first classification stage performed to precede forwarding operations in a switching controller.

As described in more detail under Issue 1, Kilkki teaches a SIMA-based network including an access node (e.g., a user/network interface (USI)) that determines a priority for an ATM cell and a separate core node (e.g., a network node) that filters the cell based on the priority. Appellant is unaware of any disclosure or suggestion in the prior art to perform any of the steps claimed in claim 15 in the access controller specifically. In particular, Kilkki fails to suggest performing classification, buffering, and packet admission in the access controller.

(b) Rom fails to disclose the switching controller of claim 15

Examiner concedes that Kilkki fails to disclose a disposition engine, for which he cites Rom. In particular, Examiner states in the final office action, paragraph 15, that:

> Kilkki differs from claim 15 in that he fails to disclose the use of a switching controller that determines whether the admitted packet is to be forwarded to a destination address. However, the use of a switching controller for managing output from a network device is old and well known in the art. For example, Rom et al. disclose delivering the inbound packet to a switching controller (citation omitted), which has the advantage of forwarding the packet to its destination via the correct port.

Although Appellant would concede that Rom discloses a form of "switching controller" and that the switching controller performs classification, Rom does not disclose or suggest that the switching controller be adapted to execute the subset of the classification operations allocated to the access controller of claim 15. That is to say, the switching controller of claim 15 need not perform access control operations assumed by the access controller.

(c) There is no motivation to combine Kilkki and Rom

Claim 15 is allowable because the motivation advanced by Examiner is insufficient to support a prima facie case of obviousness. Examiner has stated on page 6, lines 7-12, of the March 13, 2004 office action that:

> [o]ne skilled in the art would have recognized the advantage of the switching controller as taught by Rom et al. Therefore, it would have been obvious to a person with ordinary skill in the art at the time of the invention to incorporate the use of a switching controller as taught by Rom et al. into the invention in Kilkki to achieve the advantage of forwarding the packet to its destination address.

Appellant respectfully asserts that Examiner's argument fails because Examiner's statement does not support a prima facie case of obviousness. Examiner's statement is a conclusory statement that fails to set forth the "advantage of forwarding the packet" that is achieved by incorporating the switching controller of Rom with Kilkki. If, on the other hand, Examiner is suggesting that packet forwarding *is the* advantage, then the statement is overly vague to suggest combining Rom with Kilkki in the manner claimed.

(d) The combination of Kilkki and Rom fail to teach claim 15

The combination of Kilkki and Rom fail to teach that the packet processing operations be divided among different processors to unburden the switching controller. In particular, the prior art fails to disclose or suggest that the access controller be adapted to perform classification operations and packet admission based upon congestion status data derived from the classification information before transmitting the admitted packet to a switching controller.

In the absence of a suggestion to combine, one skilled in the art may be motivated to combine Kilkki and Rom to create a system adapted to perform the packet processing of both references in the same processor. If the Kilkki and Rom processing were performed in a single processor, it would not achieve the distribution of processing sought in the present invention to unburden the switching controller. The claimed invention is therefore different from the method that results from the combination of references cited.

Issue 16—Whether claim 16 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 16 recites that the access controller of claim 15 is a "media access controller," which is not disclosed in the cited art. As discussed in more detail in Issue 2, the media access controller is a controller operating at the media access control (MAC) level, which refers to Layer 2 of the Open Systems Interconnect (ISO) reference model discussed by Rom (col. 5, lines 5-29) as well as countless other

publications known to those skilled in the art. Using the media access controller to execute the initial classification operation in conjunction with other OSI Layer 2 operations enables the data communications switch to determine—earlier than prior art switches—whether to provide the packet access to the particular node before reaching the same node's switching controller, thus obviating the need to allocate resources of the switching controller should the packet be denied access.

In support of the rejection, Examiner again asserts that the SIMA service model (col. 5, lines 11-24 and 43-44 [sic]) in Kilkki discloses that the media access controller. Examiner's reliance on the SIMA service model is, however, misplaced because the SIMA service model, as explained by Kilkki, refers to a traffic management scheme *in two or more nodes in a network*, not a single node. In particular, Kilkki assigns packet marking operations to access nodes and assigns packet filtering operations to core nodes, thus distributing specialized tasks to nodes throughout the network. The SIMA service model, however, does not disclose or suggest where or how the SIMA operations could be performed *within a single node*. Nor does Kilkki disclose or suggest that any of the SIMA operations be performed in a media access controller in conjunction with other OSI Layer 2 operations. Thus, claim 2 is patently distinguishable from the prior art.

Issue 17—Whether claim 17 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 17 recites that first set of classification information includes a priority associated with the inbound packet. Dependent claim 17 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 15. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 15.

Issue 18—Whether claim 18 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 18 recites that the step of admitting the inbound packet access controller gives precedence in admitting packets associated with a first priority over packets associated with a second priority. Using this packet precedence scheme, a data communication node determines a priority to apply to the packets of an incoming packet stream and uses the priority for allocating resources in the switching controller among select packet flows. Dependent claim 18 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 15. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 15.

Issue 19—Whether claim 19 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 19 recites that the first set of classification information includes a priority associated with the inbound packet. Dependent claim 19 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 15. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 15 and intervening claim.

Issue 20—Whether claim 20 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 20 recites that the first set of classification information includes a priority associated with the inbound packet. Dependent claim 20 is

considered allowable over the references applied in its rejections for the same reasons discussed under Issue 15. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 15 and intervening claim.

Issue 21—Whether claim 21 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 21 recites that the first set of classification information includes a priority associated with the inbound packet. Dependent claim 21 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 15. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 15 and intervening claim.

Issue 22—Whether claim 22 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 22 recites that first set of classification information includes a priority associated with the inbound packet. Dependent claim 22 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 15. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 15 and intervening claim.

Issue 23—Whether claim 23 is patentable under 35 U.S.C. § 103(a) over Kilkki in view of Rom?

Dependent claim 23 recites that first set of classification information includes a priority associated with the inbound packet. Dependent claim 23 is considered allowable over the references applied in its rejections for the same reasons discussed under Issue 15. Inter alia, none of these references, taken either singly or in proposed combination, disclose, teach or suggest serially connecting an access controller and switching controller in the manner recited in claim 15 and intervening claim.

Conclusion

For the extensive reasons advanced above, Appellant respectfully but forcefully contends that each claim is patentable. Therefore, reversal of all rejections is respectfully requested.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the firm deposit account number 02-3979 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Appendix

Claim 1: A data communication node comprising:

an access controller adapted to: receive an inbound packet, classify the packet wherein a first set of classification information is generated, and admit the packet classified by the access controller into the node based on the first set of classification information; and

a switching controller coupled to the access controller, wherein the switching controller is adapted to: receive the admitted packet from the access controller, further classify the admitted packet wherein a second set of classification information is generated, and forward the packet classified by the switching controller to a destination address based on the second set of classification information.

Claim 2: The data communication node of claim 1, wherein the access controller is a media access controller.

Claim 3: The data communication node of claim 1, wherein the first set of classification information includes a priority associated with the inbound packet.

Claim 4: The data communication node of claim 3, wherein the access controller gives precedence in admitting packets associated with a first priority over packets associated with a second priority.

Claim 5: The data communication node of claim 1, wherein the access controller includes a buffer storing admitted inbound packets.

Claim 6: The data communication node of claim 5, wherein the congestion status data includes a buffer utilization level, the access controller admitting the inbound packet if the utilization level is lower than a predetermined threshold level.

Claim 7: The data communication node of claim 5, wherein the congestion status data includes a buffer utilization level, the access controller discarding the inbound packet if the utilization level is higher than a predetermined threshold level.

Claim 8: The data communication node of claim 1, wherein the access controller discards the inbound packet based on a discard probability that varies based on the first set of classification information.

Claim 9: An access controller in a data communication node comprising:

an input receiving an inbound packet;

a classification engine coupled to the input classifying the inbound packet, wherein classification information is generated;

a buffer storing admitted inbound packets; and

a disposition engine coupled to the classification engine and the buffer, wherein the disposition engine is adapted to receive the classification information, determine whether the inbound packet is to be admitted based on a utilization level of the buffer determined from the classification information, and deliver the inbound packet to a switching controller if the packet is admitted.

Claim 10: The access controller of claim 9, wherein the classification information includes a priority associated with the inbound packet.

Claim 11: The access controller of claim 10, wherein the disposition engine gives precedence in admitting packets associated with a first priority over packets associated with a second priority.

Claim 12: The access controller of claim 9, wherein the disposition engine admits the inbound packet if the utilization level of the buffer is lower than a predetermined threshold level.

Claim 13: The access controller of claim 9, wherein the disposition engine discards the inbound packet if the utilization level of the buffer is higher than a predetermined threshold level.

Claim 14: The access controller of claim 9, wherein the disposition engine discards the inbound packet based on a discard probability that varies based on the classification information.

Claim 15: A method for packet traffic management in a data communication node including an access controller and a switching controller, the method comprising:

at the access controller:

receiving an inbound packet;

classifying the inbound packet, wherein classification information is generated;

determining congestion status data from the classification information;

admitting the inbound packet based on the congestion status data; and

delivering the admitted inbound packet to the switching controller; and

at the switching controller, determining whether the admitted packet is to be forwarded to a destination address.

Claim 16: The method of claim 15, wherein the access controller is a media access controller.

Claim 17: The method of claim 15, wherein the classification information includes a priority associated with the inbound packet.

Claim 18: The method of claim 17, wherein the admitting the inbound packet further comprises giving precedence to packets associated with a first priority over packets associated with a second priority.

Claim 19: The method of claim 17 further comprising storing the inbound packet in a

packet buffer associated with the access controller if the packet is admitted.

Claim 20: The method of claim 19, wherein the determining of the congestion status data comprises determining a utilization level of the packet buffer.

Claim 21: The method of claim 20, wherein the admitting of the inbound packet comprises admitting the inbound packet if the utilization level of the packet buffer is lower than a predetermined threshold level.

Claim 22: The method of claim 20 further comprising discarding the inbound packet if the utilization level of the packet buffer is higher than a predetermined threshold level.

Claim 23: The method of claim 20 further comprising discarding the inbound packet based on a discard probability that varies based on the classification information.